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# The EXTENSION ENTOMOLOGIST



In 1921 the Committee on Organization and Policy of the Land Grant College Association gave the following definition of the job of the subject-matter specialist:

"A fundamental principle underlying extension work is that the agricultural college and experiment station and the United States Department of Agriculture have something to extend. If this principle is correct it then makes necessary the employment of subject-matter specialists who shall represent the subject-matter departments of our colleges and stations and the United States Department of Agriculture, and who shall assist the county agents in organizing and forwarding their subject-matter programs. These specialists are absolutely necessary to the greatest success of county agent work, and to all cooperative extension work. We recommend that in reports of accomplishments the work done by specialists shall be recognized and their place in the organization shall be clearly shown."

Any changes made during the past 20 years have not minimized the need for subject-matter specialists; in fact they have further justified the need for well-trained specialists with a broad view of agriculture. In the past few years we have heard much of planning, coordination, and integration, terms which are not new to the extension entomologists, because the field of entomology is so broad it touches upon the whole field of agriculture. We should, however, give consideration to the newer phases of planning as referred to in Mr. Gilbertson's article in this issue. It is our duty as entomologists to see that insect control is recognized by the people taking the lead in land use planning.

UNITED STATES DEPARTMENT OF AGRICULTURE  
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE AND  
EXTENSION SERVICE, COOPERATING

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UNITED STATES DEPARTMENT OF AGRICULTURE

Washington, D. C.

T H E   E X T E N S I O N   E N T O M O L O G I S T

Issued by the Extension Service and the Bureau of Entomology and Plant Quarantine cooperating with other Federal and State agencies in the furtherance of extension work in entomology.

M. P. Jones  
Senior Extension Entomologist

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ANNOUNCEMENTS

June 23-27, 1941. Summer Meeting, American Association of Economic Entomologists, Durham, N. H.

July 18-20, 1941. Pacific Slope Branch, American Association of Economic Entomologists, California Institute of Technology, Pasadena.

August 19-22, 1941. Rocky Mountain Conference of Entomologists.

The Section of Extension A.A.E.E., elected Sam C. McCampbell, Fort Collins, Colo., chairman, and G. F. MacLeod, Berkeley, Calif., secretary.

The 1941 meetings are to be held in San Francisco, Calif. Any one having suggestions on the program for this Section should correspond with either officer at an early date, because the program usually is made up a few months in advance.

REPORT - SECTION OF EXTENSION  
AMERICAN ASSOCIATION OF ECONOMIC ENTOMOLOGISTS

Philadelphia, Pa., December 28, 1940

The December 1940 issue of the Extension Entomologist carried the program for the meeting of this group in Philadelphia. A brief report at this time should prove interesting to those who were not present. Fifteen extension entomologists and about an equal number of other entomologists attended our session.

The report of Mr. Lehker's survey in Indiana on Extension Entomology: A Study of Methods and Results contained some interesting material which provided much food for discussion in the first panel. Of the 2,575 farms surveyed, 200 were house to house visits; the remaining surveys were through vocational agricultural schools. In the house to house survey, the occupants of every third house were interviewed. The survey was intended to be a cross section of rural Indiana and was not based on large growers of major commodities. It should be remembered also that an extension entomologist had been on the job there about 4 years at the time the survey was made.

The summary of Mr. Lehker's report is submitted to give a gist of his findings:

"Some of the more important facts brought to light as a result of this study are:

"1. More than 70 percent of Indiana farms have no equipment adequate for dusting plants. Approximately 50 percent are without adequate sprayers, and 38 percent have neither adequate sprayers nor dusters.

"2. An average of 85 percent of the people possessed the crops, livestock, or property referred to in the study. Of this number, an average of 52 percent applied some treatment intended to control insects. These figures ranged from 86 percent who treated for the control of chicken mites to 3.5 percent who practiced termite control.

"3. The dealer influenced the adoption of more practices than any other source of information, as indicated by the fact that an average of 25 percent of all sources reported were credited to him. Neighbors or friends were second, and home remedies third in line of influence, with averages of 19 percent and 17 percent respectively of the total sources credited to them.

"4. The reliability of the sources of information was, in general, inversely proportional to their degree of influence. Farm visits by county agents or specialists, and exhibits were 100 percent reliable, whereas home remedies were less than 40 percent reliable.

"5. Direct extension sources of information influenced the adoption of about 16 percent of all practices used to control insects, as

indicated by that percentage of the total sources credited to them. Primarily extension sources influenced another 13 percent of the practices, whereas about 70 percent had been adopted because of either indirect or nonextension influence.

"6. It would appear from an analysis of this study, that there is a distinct need for educational work in entomology among farmers of Indiana."

The lack of time prevented a thorough discussion of the second panel, Coordination of Entomology With Other Subject Matter in Extension Programs Relating To: (a) Crops; (b) livestock; (c) the home. The discussion did not follow the title too closely but centered around coordination in general. In opening the discussion, Mr. Lyle called attention to the fact that entomologists, like other subject-matter people, could most effectively carry on their work by coordinating it with that of other specialists and agencies. He called attention to Extension Service Circular 318 (January 1940), A Study of Extension Projects in Entomology by T. H. Parks, extension entomologist, Ohio State University. This survey revealed that the entomology specialists are cooperating quite extensively with college departments and other educational, commercial, and social agencies. Mr. Lyle pointed out that because Mr. Lehker's survey showed that 25 percent of the information farmers receive is credited to the dealer, even greater effort should be made to educate them.

Cooperation in a potato production project in a certain State offers another illustration. Several years ago when it was started, each specialist worked independently of the others on the subject. This plan didn't work out satisfactorily. Then one person was selected to head the project, but this plan failed to accomplish the desired results. Finally, all the specialists whose fields related to potato production got together, pooled their efforts, and are carrying out a well-coordinated program in a satisfactory manner.

The chairman suggested in his opening remarks that no definite summary would be made and that the object of the panel was to stimulate discussion and thought by those present. By this criterion the session accomplished its purpose. After about 3 hours of discussion on the above topics, the session closed.

At the suggestion of the secretary, a number of the extension entomologists brought along colored slides and motion pictures. These were shown Sunday morning, before an appreciative group. Some remarkably fine slides and movies are in the possession of certain specialists, and there is a growing desire among the group for some means of extending the use of this material to fellow workers in other States.

PLANNING FOR EXTENSION WORK IN ENTOMOLOGY

Considerable emphasis is now being placed on planning, and the question often arises as to how accurately an extension entomologist can plan his work. In reviewing the plans and annual reports from the several States, it is surprising to notice how much of the work planned is actually carried out. The most tangible analysis can be made from the goals set up in plans and the amount of work done on these as listed in annual reports. A study of the 128 goals and results revealed that, on a weighted average basis, 94 percent of the work projected was completed. The following table gives a summary of the data:

Goals and Accomplishments

Accomplishments	Goals		
	Number	Percentage	Percentage of work
Just completed	65	51	100
More than completed	21	16	186
Total.....	86	67	120 weighted
Partly completed	27	21	52
Nothing done	15	12	0
Total.....	42	33	40 weighted
Total completed	86	67	120 weighted
Total incompletely	42	33	40 weighted
Total.....	128	100	94 weighted

The first section of the table shows that of the 128 goals set up, 65 goals, or 51 percent, were just completed. On 21 of the goals, or 16 percent, circumstances necessitated doing 86 percent more work on these than was outlined. A weighted average of the work just completed and that done in excess of that set up in goals shows 120 percent of the work on these goals was actually done.

The second set of data is of the goals that fall short of completion. Twenty-seven goals, or 21 percent, had 62 percent of the work projected completed. Fifteen goals, or 12 percent, had no work done on them.

The weighted average percentage of the work done in excess of that projected and of that which fell short is 94 percent. This table indicates that by careful planning it is possible to project extension work in entomology. However, experience is a valuable teacher, and a thorough knowledge of the insects with which you are working, your

agriculture, your crops, and your people are vital to successful projecting of work. This point is illustrated by the fact that one of the oldest extension entomologists completed 99 percent of the work set up in his goals, calculated on the above basis, whereas one younger man rated 87 percent, and another younger man 120 percent.

An idea of the types of goals and accomplishments used in this study may be found in the December 1937 issue of "The Extension Entomologist."

It is realized that the sample was small, but when goals and accomplishments are set up in more plans and reports, a more accurate analysis can be made.

#### ENTOMOLOGY AND LAND USE PLANNING \*

By George F. Gilbertson, Extension Entomologist,  
Brookings, South Dakota

"Possibly entomologists have participated too little in assisting in the formulation of specific procedures aimed at achieving the broad objectives of the agricultural program. Many practices have been urged to achieve these objectives which run counter to best practices for insect control. In some instances modifications should be made in deference to the importance of the entomological aspects of the problem, while in others entomological practice should be modified to meet the new conditions. Which action should be taken will depend entirely upon the specific situation as revealed by a careful analysis of the objectives and entomological and other effects. In any event, these procedures call for intelligent consideration to determine whether minor modifications may be made to provide for insect control without defeating important objectives, whether control recommendations may be modified without serious loss, and whether entomological recommendations which may be in conflict are actually based on sound, tested research information or have merely grown up over a period of years because they were thought to be good practice. In many instances, reconciliation between the general agricultural program and the needs for entomological control will call for research to adapt entomological procedure to the changed conditions. Possibly many recommendations for insect control have been based in the past to too large an extent on considerations involving only insect control and have not taken adequately into consideration other values and other interests."\*\*

In this great State of South Dakota, agriculture is beset with a great many biotic hazards. Our situation here is not a great deal different from other midcontinental areas, notably the pampas of

\* A paper presented at a land use planning meeting.

\*\*Recent Changes in Agriculture and Their Effect on Insect Problems.

P. N. Annand. Jour. Econ. Ent., Vol. 33, No. 3, p. 493.

Argentina, the veld of South Africa and the steppes of Siberia. These areas together with the great plains of North America are subject to wide fluctuations in temperature and rainfall. They have drought and so-called normal rains.

Why blame nature when man is so often at fault?

In dry years frequently we have an accumulated build-up of insect enemies. This natural build-up is also augmented by the crops we raise and the way we farm. By the growth of succulent green crops we have greatly increased the areas of insect distribution. Through our farm methods we furnish these insects ideal overwintering quarters. In brief, we are prone to lay the blame upon nature for a condition for which we are responsible. Are we, therefore, to consider insect problems as natural phenomena, sit back and wait until the insects recede, or are we to analyze the situation, determine how much of the responsibility is ours, and correct these faults?

Grasshoppers are recurrent.

Since 1852, during 87 years of agriculture in South Dakota, 37 years have been grasshopper years, 17 of these 37 years have been State wide in destructiveness. To many people this is an act of nature which cannot be circumvented; the fatalistic feeling is adopted and the conclusion is erroneously drawn that with plenty of rain the problem will be solved.

However, what is the normal in these great plains? Is it plenty of rain or rain sufficient possibly to mature a crop and yet not sufficient rain to control grasshoppers? I again refer to the history of 37 years of grasshoppers out of 87 crop years. The grasshopper problem, therefore, is recurrent. It is regular, you cannot class it with an occasional hazard such as floods or tornadoes. It is a problem that must be considered carefully, analyzed, and plans made accordingly. In analyzing the problem it is clearly obvious that man plays a large part in the increase of these pests since he has disturbed the ecological adjustment which permits their increase.

Chemical control out.

In attempting to control insects under field conditions on a vast scale as we have them in South Dakota, chemical control (sprays, baits, and dusts) is out of the question. It is too expensive. We do not have the machinery to apply it, the application must be timely to obtain the best results. Our hope of control lies in farm practices and farm management. We must consider the types, timeliness, and earliness of these practices. We must so arrange them that they interfere seriously with the well-being of the pest in question. Our object is to prevent increase and keep these pests below the hazard line. In this connection we must remember that we cannot recommend a series of farm practices that conflict with water conservation, soil erosion, soil fertility, and the best agronomic practices.

Need for coordination.

A coordinated program must be worked out which considers both physical and biotic hazards. The State crop picture has shown year after year that there are a number of farmers who farm against these hazards. In every 'hopper area will be a group of individuals who will intelligently put into practice the teachings of the research of the extension worker. These men till with biotic and physical hazards uppermost in their minds. They plant varieties of crops that because of earliness or unpalatability are not susceptible to insect attack. They manage their pastures and ranges in such fashion that insects cannot get a foothold through overgrazed conditions. They use chemical control as merely a mopping-up process in places where they cannot till, such as headlands and roadsides. These men have planned well; they harvest while their neighbors do not.

Plans must recognize insect hazard.

They begin to see that to survive on these great plains they must include in their plans constant warfare against organisms which compete with them for food. They begin to see, too, that the condition is not hopeless; that by intelligent planning and by putting these plans into operation they can evolve a basic system of agriculture which yields incomes in spite of these hazards. To me the land-planning project is a wonderful opportunity for the study and active prosecution against insects.

There is a certain resistance we must break down, and I believe through this set-up that if we can put across the why of pest abundance, we are in a position to correct our faults and to reduce these insect populations. Too many people class insect abundance with the acts of God; they are prone to place the blame upon nature. If we can point out that man-made causes are often responsible for insect outbreaks, and that a shift in farm practices and farm management may correct these faults, the farmer is ready to accept them.

Plan for prevention.

Since it is the business of the Extension Service to teach, I believe that it is my duty to meet with these land-planning groups to show that certain agricultural procedures must be adopted and aimed at the reduction of the insect problem. If a given insect survey shows a threatening to severe expectancy for the next growing season, it is clearly evident that certain agricultural procedures must be put into practice to ward off the impending outbreak, even though these agricultural procedures may for the time being conflict with other recommendations. In other words, this program cannot be static, but it must be flexible. There will be years when the insect problem is acute and our efforts must be coordinated toward the suppression of insects. Conversely, when the insect problem is at low ebb, insect practices must subordinate themselves to other pressing problems.

TIMELY TOPICS

STORED-CORN INSECTS AND THE EVER-NORMAL GRANARY

In response to a demand resulting from the operation of the "ever-normal granary," the sum of \$6,000 has been allotted to the Bureau of Entomology and Plant Quarantine by the Commodity Credit Corporation for stored-corn-insect investigations. This sum will be expended in the solution of problems arising from the storage of corn in farm- and Government-owned bins, in cooperation with the several agencies concerned in the operation of the "ever-normal granary." Temple F. Winburn, of the Manhattan, Kans., staff, has been assigned to this work under the supervision of R. T. Cotton, with headquarters at Urbana, Ill.

ALFALFA WEEVIL PROJECT TERMINATED  
AND MORMON CRICKET RESEARCH EXPANDED

On June 30, 1940, the alfalfa weevil research project, with headquarters located at Room 483, Federal Building, Salt Lake City, Utah, was terminated. This project, which was begun in 1910, and therefore was conducted for a period of 30 years, resulted in a thorough knowledge of the bionomics of the insect and the origination of satisfactory and economical control methods.

Coincident with the termination of this project, the research work on the Mormon cricket has been expanded by the establishment of a new station at Winnemucca. The street address is: Corner of West Fifth and Pavilion Streets, and the mailing address is P. O. Box 76, Winnemucca, Nev. J. C. Hamlin, formerly in charge of the alfalfa weevil project, has been placed in charge. H. H. Walkden, formerly located at Manhattan, Kans., has been designated as assistant at Winnemucca.

OCTOBER FLIGHTS OF GRASSHOPPERS

The area most heavily infested with second-generation M. mexicanus in mid-October included the eastern tier of counties in Colorado, the western half of Kansas, and parts of the Oklahoma and Texas Panhandles. In the northern half of the area, flights were generally of minor importance and local in nature, but in the southern half, several heavy flights from southwestern Kansas extended the infested area approximately 100 miles into Texas. Early in October heavy flights were reported from six counties of southwestern Kansas.

SCREWWORM-CONTROL PROGRAM IN TEXAS

Results of surveys and research on the biology, habits, distribution, and abundance of the screwworm fly in Texas during the last 5 years indicate that a high degree of control of the pest can be obtained if certain ranch practices are followed during the year, especially during the winter in the southern part of Texas, where it overwinters. On the basis of the research observations, a plan was formulated by which

an experimental control program could be undertaken by the Bureau of Entomology and Plant Quarantine, in cooperation with the Extension Service, Experiment Station, livestock associations, and other agencies interested in the screwworm problem of Texas.

On October 16, the plan was presented in conference to the representatives of the above mentioned agencies at College Station, Tex. The Bureau of Entomology and Plant Quarantine was represented at the conference by P. N. Anrand, assistant chief of Bureau; F. C. Bishopp, chief of the Division of Insects Affecting Man and Animals, who presided as chairman; and E. C. Cushing, D. C. Parman, and W. L. Barrett, who presented the proposed program. All representatives of the State organizations enthusiastically endorsed the program and offered their full support in putting it into effect.

Following the above conference, information regarding the program was presented to the district meeting of county agents of the Texas Extension Service districts at Corpus Christi on October 25 by E. C. Cushing and W. L. Barrett.

On November 12, 13, 14, and 15, the program was presented at Uvalde, Beeville, Boerne, and Gonzales to county agents of Extension District 10. On December 12 the program was presented to the Texas Sheep and Goat Raisers annual convention at San Angelo.

#### IMMUNITY TESTS FOR SALT-MARSH-MOSQUITO BITES

No immunity to irritation has been observed by G. H. Bradley and B. V. Travis, of the New Smyrna Beach, Fla., laboratory, Bureau of Entomology and Plant Quarantine, after approximately 1,500 mosquito bites on the right forearm in 1939 and 1,200 on the same area in 1940. Their records show that some people may be three times more attractive to salt-marsh Aedes than are others.

#### HOUSEFLIES CARRY MASTITIS

Successful Farming, December, cites recent experiments at the Florida Experiment Station to prove that houseflies spread mastitis among dairy cows. In the test, cows shown to be free of all traces of mastitis were placed in a screened, isolated building. Flies were confined to a screen cage and allowed to feed freely on milk from the quarters of mastitis-infected cows. The insects were then permitted to contact the healthy cows. The disease was readily transmitted by this method.

#### TRAPPING HORN FLIES

Data obtained by W. G. Bruce indicate a marked reduction in number of horn flies where cattle-fly traps have been installed. Cattle in a trapped pasture averaged 100 flies per head, whereas cattle in untrapped pastures averaged over 1,000 flies per head. The percentage

of each species of flies, as determined by a sample of 500 flies taken from a cattle-fly trap, was as follows:

<u>Species</u>	<u>Percent</u>
<u>Haematobia irritans</u> L.-----	96.6
<u>Stomoxys calcitrans</u> (L.)--	1.4
<u>Sarcophaga</u> spp-----	.6
<u>Cochliomyia macellaria</u> (F.)	.8
<u>Lucilia</u> spp-----	.2
<u>Cryptolucilia</u> spp-----	.4

#### AMOUNT OF BLOOD ENGORGED BY HORN FLIES

Interesting data on the average amount of blood taken by individual flies, Haematobia irritans L., and the total amount of blood lost by a herd of cattle because of these flies, were submitted by W. G. Bruce, of the Dallas, Tex., laboratory, Bureau of Entomology and Plant Quarantine.

It was found that an average meal of blood of each horn fly was from 1.04 to 2.19 mg. and that two meals were taken daily. Using these data, Mr. Bruce estimated that on one ranch near Cresson, Tex., where there are 500 head of cattle with a normal infestation of approximately 4,000 horn flies per head, 7 quarts of blood were lost daily during the fly season. At that rate, a rough estimate would be 312 gallons, or 2,713 pounds of blood lost during the fly season by this herd of cattle.

#### EFFECTIVENESS OF CRYOLITE AND CUBE SPRAYS AGAINST TOBACCO-FLEA BEETLE

In one series of toxicity tests conducted on small replicated field plots of tobacco grown for flue-curing, Norman Allen, of the Florence, S. C., laboratory, Bureau of Entomology and Plant Quarantine, found that a spray mixture consisting of 6 pounds of cryolite containing 86 percent of the sodium fluoaluminate ( $\text{Na}_3\text{AlF}_6$ ) and 2 pounds of cube root powder containing 4 percent of rotenone to 50 gallons of water was more effective against Epitrix parvula (F.) than was a spray mixture consisting of 2 pounds of cube, containing 4 percent of rotenone, to 50 gallons of water.

A third spray mixture included in the test consisted of 2 pounds of lead arsenate and 2 pounds of cube, containing 4 percent of rotenone, to 50 gallons of water. However, the infestation did not increase after treatment on tobacco treated with spray mixtures containing cryolite and lead arsenate so quickly as they did on the tobacco sprayed with the cube mixture only.

Each of the three treatments was applied to 3 plots of tobacco containing about one-twelfth acre each. Application was by means of a mule-drawn traction sprayer, equipped with a vertical spray boom in such

a way that three nozzles sprayed both sides of the tobacco plants of every row.

Although the application rates were recorded as ranging from 85 to 108 gallons per acre, including the spillage, the actual application rate of each treatment was about 75 to 80 gallons an acre.

#### DUSTS MADE FROM NUTS OF CALIFORNIA BUCKEYE TOXIC TO MEXICAN BEAN BEETLE

A series of small-scale tests conducted at the Columbus, Ohio, laboratory, Bureau of Entomology and Plant Quarantine, by J. W. Apple and N. F. Howard have shown that flours made from the meat or hulls of nuts of California buckeye (*Aesculus californica*) are toxic to laboratory-reared larvae and adults of *Epilachna varivestis* Muls., when applied to bean foliage. All feeding tests were conducted under a constant temperature of 85° F. and a relative humidity of 50 percent.

Although the data show that neither the meat nor hull flour are violent poisons, small dosages over an extended period do produce mortality. Other data obtained in the course of these studies showed that female bean beetles lay very few eggs while feeding on foliage dusted with meal or hull flour; however, fewer eggs were laid by females feeding on the meat flour than by those feeding on the hull flour. The viability of eggs produced by poison-eating females was found to be no different from the viability of eggs from beetles fed untreated foliage. Larvae that were fed sublethal dosages of the meat or hull flours formed pupae that possessed rather abnormal wing buds. Instead of lying close to the body, the buds extended at right angles from the thoracic region. Only a few adults emerged from such pupae, and all but one of them died soon after emergence. These adults also had misshapen wings.

#### TESTS WITH CALIFORNIA BUCKEYE FLOUR AGAINST ANTS

In one small-scale test, Messrs. Apple and Howard found that flour made from the meat of California buckeye nuts apparently had no effect upon a colony of the ant *Formica pallidefulva schaufussi* var. *incerta* Em. when such flour was dusted on the soil about the nest, being replenished after each rain for a period of 43 days. In another test, they found that neither the meat flour nor the alcoholic extracts of the meat and hull flours had any apparent toxic effect on the two species of ants in their nests when they were fed these materials mixed with honey for a period of 37 days. The treatments tested were 1 percent meat flour in honey, 10 percent meat flour in honey, the extract from 1 gram of meat flour and 9 grams of honey, and the extract of 1 gram of hull flour in 9 grams of honey. The species used in the latter test were *Lasius niger* (L.) var., and *Prenolepis imparis* (Say).

## A NEW DISTRIBUTION RECORD FOR A PEST OF APPLE

Among material submitted for determination by C. F. Doucette, Summer, Wash., laboratory, Bureau of Entomology and Plant Quarantine, was a large series of Anthophila pariana (Clerck) (Glyphipterygidae). This species was formerly placed in the genus Hemerophila. The first record of its occurrence in North America was published by E. P. Felt (Journ. Econ. Ent., v. 10, p. 502, 1917), under the title, "Apple and Thorn Skeletonizer." In that paper the insect was listed from several localities in New York State. In the National Museum there are specimens from Connecticut, Rhode Island, New Jersey, and New York, but those received from Mr. Doucette, in Washington, represent the first-known record of the occurrence of A. pariana in western United States.

## WHITE-FRINGED-BEETLE QUARANTINE RESTRICTIONS MODIFIED

### Division Domestic Plant Quarantine

Intensive control work on the white-fringed beetle infestations during the last few years have so reduced beetle populations that the Federal quarantine regulations have been further modified to lift all restrictions on the movement from any part of the regulated area of cotton lint, baled or unbaled, and also on cottonseed when free from gin trash. Sanitation practices at the cotton gins are required to be maintained. This modification was made effective August 9, 1940, by a revision of Circular 485, Bureau of Entomology and Plant Quarantine.

## TOXICITY AND REPELLENCE OF PARIS GREEN AFFECTED BY PARTICLE SIZE

E. R. McGovran and E. L. Mayer, of the Division of Control Investigations, Bureau of Entomology and Plant Quarantine, and C. C. Cassil, of the Division of Insecticide Investigations, Bureau of Entomology and Plant Quarantine, report that the toxicity and repellency of paris green to the Mexican bean beetle is influenced by the particle size of the insecticide. Mr. Cassil, who prepared the three fractions of paris green, removed the fine particles from the coarser fractions by controlled sedimentation and decantation in ethyl alcohol after these fractions had first been separated by the usual sieving procedure. The finest fraction was separated out by a Federal air classifier. Most insecticidal dusts, even when considered to be coarse, contain considerable fine material which probably has a marked effect on their toxicity.

The outstanding characteristic of these three fractions was that the particles in each were of remarkably uniform size. Practically all the fine particles were removed from the 12 micron (average diameter of particle) and 22 micron fractions. Under field conditions, paris green is very toxic to bean foliage, but under the laboratory conditions of these tests, where spray and dusts were applied only to the upper surface of the leaves and the spray dried in 5 minutes or less, no appreciable injury became evident during the 48 hours the beetles were allowed to feed on the treated foliage.

These laboratory tests showed that paris green particles with an average diameter of 1.1 microns caused the highest mortality among the insects and permitted the least feeding, when applied to bean foliage either as a spray or a dust. The 12-micron particles caused an intermediate percentage of mortality and degree of feeding and the 22-micron fraction caused the lowest mortality and permitted the largest amount of feeding.

#### LADYBUGS IN COLD STORAGE

Ice and Refrigeration, December, says that a cold-storage house in Modesto, Calif., has 105 gunny sacks of ladybird beetles stored in a room in which the temperature is just above freezing. These beetles are gathered up in the hills and put in hibernation in cold storage until needed to attack aphids and other crop pests in the orchards, fields, and gardens of the State. They will live for months in the state of hibernation, and emerge into spring, summer, and fall warmth apparently as good as new.

#### INSECT CONTROL MORE VITAL NOW

The St. Paul Pioneer Press, December 8, says that T. L. Aamodt, Minnesota entomologist, said recently that control of crop destroying insects next summer, although expected to be somewhat less of a problem than in the past few years, has taken on added significance because of present world conditions. He added that food crops in the warring nations would be short next year, and that crops here should be given every possible protection against insects and diseases.

REGIONAL MEETINGS OF ENTOMOLOGISTS  
(Participated in by Extension Entomologists)

We are often confronted with the question, "Just how many entomological meetings are there, and for how many years have they been held?" The entomologists think first of the Entomological Society of America or the American Association of Economic Entomologists with its three branches and four sections, namely:

Pacific Slope Branch  
Cotton States Branch  
Eastern Branch  
Section of Plant Quarantine and Inspection  
Section of Apiculture  
Section of Extension  
Section of Teaching

The reports of these meetings are recorded in their journals; for this reason they will be referred to by name only. However, several other regional or special conferences are held in which the extension entomologists are especially interested. The following list is an attempt to register in one place the dates and places of all these meetings. It would appear that this list could be expanded to include other regional meetings, as well as those within the States, and the complete list printed in some future issue of the Journal of Economic Entomology as a permanent record.

NORTH CENTRAL STATES ENTOMOLOGISTS' MEETING

<u>Date</u>	<u>Place</u>	<u>Chairman</u>	<u>Secretary</u>
1921	La Fayette, Ind.	S. A. Forbes	J. J. Davis
1922 NO MEETING			
1923 Mar. 2-3	Urbana, Ill.	W. P. Flint	J. J. Davis
1924 Mar. 6-7	Columbus, Ohio	H. A. Gossard	T. H. Parks
1925 Mar. 5-6	La Fayette, Ind.	J. J. Davis	W. P. Flint
1926 Mar. 4-5	Urbana, Ill.	J. W. McColloch	T. H. Frison
1927 Mar. 3-5	Madison, Wis.	S. B. Fracker	D. M. Delong
1928 Mar. 1-2	St. Louis, Mo.	A. F. Satterthwait	K. C. Sullivan
1929 Feb. 28-Mar. 1	East Lansing, Mich.	(No chairman indicated)	
1930 Mar. 5-6	La Fayette, Ind.	J. J. Davis	
1931 Mar. 4-5	Champaign-Urbana, Ill.	W. P. Flint	T. H. Frison
1932 Mar. 2-3	Wooster, Ohio	J. S. Houser	L. L. Huber
1933 Mar. 2	St. Louis, Mo.	A. F. Satterthwait	
1934 Mar. 1-2	La Fayette, Ind.	J. J. Davis	W. B. Noble
1935 Feb. 28-Mar. 1	Urbana, Ill.	W. P. Flint	
1936 Mar. 5-6	Ames, Iowa	C. J. Drake	
1937 Mar. 4-5	Kansas City, Mo.	G. A. Dean	
1938 Mar. 3-4	Columbus, Ohio	T. H. Parks	
1939 Mar. 23-24	St. Paul, Minn.	A. G. Ruggles	
1940 Mar. 22-23	La Fayette, Ind.	J. J. Davis	

INTERNATIONAL GREAT PLAINS CONFERENCE OF ENTOMOLOGISTS

<u>Date</u>	<u>Place</u>	<u>Chairman</u>	<u>Secretary</u>
1921 April 12	Regina, Sask.	Norman Criddle	M. P. Tullis
1922 April 12	Minot, N. Dak.	Do.	Stewart Lockwood
1923 April 18-19	Winnipeg, Man.	Do.	A. V. Mitchener
1924 Aug. 27-28	Bozeman, Mont.	Do.	J. R. Parker
1925 Sept. 3-4	St. Paul, Minn.	Do.	A. G. Ruggles
1926 Aug. 26-27	Lethbridge, Alta.	Do.	H. L. Seamans
1927 Aug. 31-Sept. 1	Saskatoon, Sask.	Do.	Kenneth King
1928 Sept. 12-13	Fargo, N. Dak.	Do.	J. A. Munro
1929 Aug. 8-10	Treesbank	Do.	Norman Criddle
1930 Aug. 28-30	Blairmore, Alta	Do.	H. L. Seamans
1931 Aug. 13-15	Bozeman, Mont.	Do.	A. L. Strand
1932 Aug. 25-27	Edmonton, Alta	Do.	E. A. Strickland
1933 Aug. 2-4	Regina, Sask.	A. G. Ruggles	Kenneth King
1934 Aug. 9-10	Lake Itasca, Minn.	Do.	A. G. Ruggles
1935 Aug. 1-2	State Game Lodge, S.Dak.	Do.	H. C. Severin
1936 July 29-30	Brandon, Man.	Do.	R. D. Bird
1937 July 29-30	Bozeman, Mont.	Do.	A. L. Strand
1938 July 27-28	Swift Current, Sask.	T. L. Aamodt	Kenneth King & Robert Glen
1939 July 27-28	Univ. Farm, St. Paul, Minn.	A. G. Ruggles	A. G. Ruggles
1940 Called off because of war.			

NORTHWEST ASSOCIATION OF HORTICULTURISTS,  
ENTOMOLOGISTS, AND PLANT PATHOLOGISTS

(British Columbia, Idaho, Oregon, Washington)

<u>Date</u>	<u>Place</u>	<u>President</u>	<u>Vice-Pres.</u>	<u>Sec.-Treas.</u>
1921 July 26-28	Hood River, Oreg.	E. R. Bennett		A. L. Lovett
1922 July 24-26	Yakima, Wash.	O. M. Morris	Wm. Downes	C.W.Hungerford
1923	Boise, Idaho	A. L. Lovett	D. L. Fischer	C.C.Vincent
1924 Aug. 26-29	Penticton, B. C.			
1925 June 22-25	Corvallis, Oreg.	Presiding Officer: Charles L. Robinson.		
1926 June 28-30	Tacoma, Wash.	H. P. Barss	F.E.Harrington	H.D.Locklin
1927 June 27-29	Moscow, Idaho & Pullman, Wash.	C. C. Vincent	D. C. Mote (Acting sec., C.L.Vincent)	B.F.Dana(Absent) C.L.Vincent
1928 June 25-28	Vancouver, B. C.	E. J. Newcomer	H. E. Morris	F.E.Buck
1929 June 26-29	Bozeman, Mont.	C.W.Hungerford	W. Downes	F.M.Harrington
1930 July 14-16	Medford, Oreg.	D. F. Fisher	J. R. Parker	C.E.Schuster
1931 July 8-11	Wenatchee, Wash.	F. C. Reimer	H. R. McLarty	Anthony Spuler
1932 June 20-22	Lewiston, Idaho	Leroy Childs	F. D. Heald	J.M.Raeder
1933 July 17-19	Hood River, Oreg.	F.M.Harrington	F. L. Webster (Rec.Sec., J. M. Raeder)	O.T.McWhorter J.M.Raeder
1934 July 18-20	Yakima, Wash.	R. L. Webster	Edwin Smith	J.M.Raeder
1935 July 17-19	Kelowna, B. C.	R. C. Palmer	F. D. Bailey	Do.
1936 July 15-16	Bozeman, Mont.	H. E. Morris	W. S. Brown	Do.
1937 July 14-16	Corvallis, Oreg.	O.T.McWhorter	H. R. McLarty	Do.
1938 July 27-29	Moscow, Idaho	H. R. McLarty	Claude Wakeland	Do.
1939 July 19-21	Wenatchee, Wash.	F. L. Overley	H. B. Mills	Do.
1940 June 20-22	Seattle, Wash.	Don C. Mote		Do.

ROCKY MOUNTAIN CONFERENCE OF ENTOMOLOGISTS

<u>Date</u>		<u>Place</u>	<u>Chairman</u>	<u>Secretary</u>
1923	Aug. 20-25	Pingree Park, Colo.	C. P. Gillette	Geo. M. List
1924	Aug. 18-23	Do.	Do.	Do.
1925	Aug. 17-22	Do.	Do.	Do.
1926	Aug. 16-21	Do.	Do.	Do.
1927	Aug. 15-20	Do.	Do.	Do.
1928	(No meeting)			
1929	Aug. 19-24	Pingree Park, Colo.	C. P. Gillette	Geo. M. List
1930	Aug. 18-23	Do.	Do.	Do.
1931	Aug. 17-22	Do.	Do.	Do.
1932	Aug. 15-20	Do.	Do.	Do.
1933	Aug. 14-19	Do.	Do.	Do.
1934	Aug. 12-17	Do.	Do.	Do.
1935	Aug. 18-23	Do.	Do.	Do.
1936	Aug. 16-21	Centennial, Wyo.		
1937	(No meeting)			
1938	Aug. 14-19	Centennial, Wyo.	C. P. Gillette	Geo. M. List
1939	Aug. 13-18	Ward, Colo.	Do.	Do.
1940	Aug. 18-23	Cameron Pass Camp, Colo.	R. H. Painter	Do.

CUMBERLAND-SHENANDOAH VALLEY FRUIT CONFERENCE

<u>Date</u>		<u>Place</u>	<u>Chairman</u>	<u>Secretary</u>
1925	July 20	Winchester, Va.	Dr. H. G. Knight	Dr. A.W. Drinkard,Jr.
1925	Dec. 11	Martinsburg, W. Va.	Dr. G. R. Lyman	E. C. Sherwood
1926	Nov. 5	Hagerstown, Md.	Dr. H. G. Knight	W. J. Schoene
1927	Nov. 22	Chambersburg, Pa.	Dr.N.J.Giddings	Do.
1928	Nov. 20	Washington, D. C.	Do.	A. W. Drinkard, Jr.
1929	Nov. 22	Winchester, Va.	Dr.F.D.Fromme	W. J. Schoene
1930	Nov. 19	Hagerstown, Md.	Dr.E.C.Auchter	G. E. Yerkes
1931	Nov. 23	Winchester, Va.	Dr.E.H.Cory	A. Lee Schrader
1932	Nov. 26	Do.	Dr.R.D.Anthony	F. N. Fagan
1933	Nov. 25	Do.	Dr.W.S.Hough	A. B. Groves
1934	Nov. 20	Washington, D. C.	Dr.J.R.Magness	J. W. Roberts
1935	Nov. 12	College Park, Md.	Dr.J.H.Beaumont	A. Lee Schrader
1936	Nov. 28	Martinsburg, W. Va.	E. C. Sherwood	Edwin Gould
1937	Nov. 27	Winchester, Va.	A. H. Teske	A. B. Groves
1938	Nov. 25-26	Waynesboro, Pa.	R. N. Fagan	R. S. Kirby
1939	Nov. 24-25	College Park, Md.	F. P. Cullinan	M. C. Goldsworth
1940	Nov. 22-23	Martinsburg, W. Va.	E. C. Gould	C. F. Taylor

(Record according to Walter Hough, who has a complete file  
of the minutes of the secretary of each meeting, 1925-40.)

MEETINGS OF WESTERN COOPERATIVE SPRAY PROJECT

<u>Date</u>		<u>Place</u>	<u>Chairman</u>	<u>Secretary</u>
1926	June 30	Tacoma, Wash.	(Organization meeting)	
	Dec. 5	Spokane, Wash.	J. R. Parker	
1927	June 27	Moscow, Idaho	E. J. Newcomer	Anthony Spuler
	Dec. 17-18	Spokane, Wash.	Do.	Do.
1928	Dec. 29-30	Do.	Do.	Do.
1929	Dec. 12	Do.	Do.	Do.
1930	Dec. 11-12	Do.	Do.	Do.
1931	Dec. 4-5	Do.	Do.	Do.
1932	Dec. 3-4	Seattle, Wash.	Do.	F. H. Overley
1933	Dec. 7-8	Portland, Oreg.	Do.	Do.
1934	Dec. 7-8	Hood River, Oreg.	Do.	Do.
1936	Jan. 13-14	Walla Walla, Wash.	Do.	Do.
1937	Jan. 18-19	Do.	Do.	Do.
1938	Jan. 25-26	Spokane, Wash.	Do.	Do.
1939	Feb. 7-8	Walla Walla, Wash.	Do.	Do.
1940	Feb. 13-14	Do.	Do.	L. G. Smith (pro tem)

ORIENTAL FRUIT MOTH CONFERENCE  
(Regional)

<u>Date</u>		<u>Place</u>	<u>Chairman</u>
1926	Jan. 18	Harrisburg, Pa.	
1927	Jan. 18	Do.	
1928	Jan. 7	Do.	
1929	Jan. 3	Washington, D. C.	A. L. Quaintance
1930	Feb. 10	Do.	Do.
1931	Mar. 3	Urbana, Ill.	B. A. Porter
1932	Mar. 2	Wooster, Ohio.	Do.

CODLING MOTH CONFERENCE  
(Regional and National)

<u>Date</u>		<u>Place</u>	<u>Chairman</u>
1927	Jan. 3	Washington, D. C.	A. L. Quaintance
1928	Jan. 4	Do.	Do.
1929	Jan. 3	Do.	Do.
1930	Feb. 10	Do.	Do.
1931	Mar. 3	Urbana, Ill.	B. A. Porter
1932	Mar. 2	Wooster, Ohio	Do.
1933	(No meeting)		
1934	Feb. 27-28	La Fayette, Ind.	B. A. Porter
1935	Feb. 26-27	Urbana, Ill.	Do.
1936	Mar. 3-4	Ames, Iowa	Do.
1936	Dec. 31	Atlantic City, N.J.	Do.
1937	Dec. 27	Indianapolis, Ind.	Do.
1938	Jan. 26-27	Spokane, Wash.	Do.

GRAPE BERRY MOTH CONFERENCE

(New York, Ohio, Pennsylvania, Michigan, Canada)

<u>Date</u>		<u>Place</u>	<u>Chairman</u>
1939	Mar. 10	Buffalo, N. Y.	C. E. Palm
1940	Mar. 5-6	Cleveland, Ohio	T. H. Parks

GRASSHOPPER AND MORMON CRICKET CONTROL CONFERENCES

<u>Date</u>		<u>Place</u>	<u>Chairman</u>	<u>Called By</u>
1931	Dec. 5	Sioux City, Iowa	C. J. Drake	State workers
1932		No conference		
1933	Aug. 20-22	Fargo, N. Dak.		Greater N. Dak. Association
1934	Aug. 30-31	Denver, Colo.	P. N. Annand	U. S. D. A.
1935		No conference		
1936	Dec. 4-5	Omaha, Nebr.	C. J. Drake	Chairman
1937	Aug. 26	Sioux Falls, S. Dak.	A. M. Eberle	S. Dak. Agencies
	Nov. 18-19	Pocatello, Idaho	C. M. Packard	L. A. Strong
		(Regional conference on Mormon Cricket Control)		
	Dec. 27-30	Indianapolis, Ind.	A. M. Eberle	
		(Regional grasshopper control committee conference)		
1938	Nov. 21-26	Omaha, Nebr.	L. A. Strong	U. S. D. A.
	Dec. 21	Minneapolis, Minn.	A. M. Eberle	Chairman
		(Northwest grasshopper control conference)		
1939	Mar. 24	Minneapolis, Minn.	A. M. Eberle	Chairman
		(Northwest grasshopper control conference)		
1940	Jan. 7-8	Denver, Colo.	A. S. Hoyt	U. S. D. A.

CHINCH BUG CONTROL CONFERENCES

<u>Date</u>		<u>Place</u>	<u>Chairman</u>	<u>Secretary</u>
1933	Sept. 8			
1933	Nov. 29	St. Louis, Mo.		
		(In cooperation with railroad officials.)		
1934	Sept. 5	Hamilton, Ill.	W. P. Flint	J. J. Davis
1935	Jan. 26	Keokuk, Iowa		
1935	Apr. 23	Do.		
1936	Dec. 4-5	Omaha, Nebr.		
		(Conference on grasshopper and chinch-bug control)		
1937				
1938				
1939	Nov. 8	Des Moines, Iowa	W. E. Dove	

EUROPEAN CORN BORER CONFERENCES

<u>Date</u>		<u>Place</u>	<u>Chairman</u>
1927	July 20-21	Toledo, Ohio. (Extension conference on control of European corn borer)	L. H. Worthley
1928	Jan. 3	Washington, D. C. (Second annual research corn borer conference)	Dr. A. F. Woods
1929	Jan. 2	Washington, D. C. (Third annual research corn borer conference)	Dr. A. F. Woods
1930	Feb. 11	Washington, D. C. (Fourth annual research corn borer conference)	Dr. A. F. Woods
1930	Oct. 15	Berkley, Mass. (Conference European corn borer projects)	Dr. A. F. Woods
1940	Jan. 23	West Springfield, Mass. (Northeastern corn borer conference)	W. C. O'Kane

PACIFIC NORTHWEST COOPERATIVE PEA-WEEVIL CONTROL PROJECT  
(Idaho, Oregon, Washington, Utah)

<u>Date</u>		<u>Place</u>	<u>Chairman</u>
1937	Jan. 19-20	Walla Walla, Wash.	Claude Wakeland
1938		Spokane, Wash.	Don C. Mote
1939	Feb. 12	Portland, Oreg.	J. C. Chamberlin
1940		Walla Walla, Wash.	R. D. Eichman T. H. Brindley

TOBACCO RESEARCH COMMITTEE

(Research on cultural problems in flue-cured tobacco area)

<u>Date</u>		<u>Place</u>	<u>Chairman</u>
1935	Aug. 5-6	Suffolk, Va.	C. B. Williams
1935	Dec. 4-5	Richmond, Va.	W. D. Reed
1936	June 24-26	Suffolk, Va.	Do.
1937	July 7-8	Florence, S. C.	Do.

At the Florence meeting a Tobacco Insect Council was formed which meets with the Tobacco Research Committee. The area has expanded to include workers from Canada, Connecticut, Florida, Georgia, Kentucky, Maryland, North Carolina, South Carolina, Tennessee, and Virginia.

THE TOBACCO INSECT AND DISEASE COUNCIL

<u>Date</u>		<u>Place</u>	<u>Chairman</u>
1938	July 19-21	Florence, S. C.	W. D. Reed
1939	Aug. 8-10	Greenville, Tenn.	Do.
1940	Aug. 7-8	Blacksburg, Va.	Do.

NORTHWEST CROP-IMPROVEMENT CONFERENCE

(Montana, North Dakota, South Dakota, Minnesota)

<u>Date</u>		<u>Place</u>	<u>Called by</u>
1937	Dec. 4-5	Minneapolis, Minn.	R. J. Haskell and O. S. Fisher
1938	Nov. 26-27	Do.	Federal Extension Service
1939	Dec. 8-9	Do.	Do.
1940	Called off.		

STORED GRAIN PEST CONFERENCE (in relation to  
ever-normal granary program)

<u>Date</u>		<u>Place</u>	<u>Chairman</u>
1938	Apr. 19	St. Louis, Mo.	Dr. P. N. Annand

HIGH PLAINS POTATO GROWERS' ASSOCIATION  
(Colo., Mont., Nebraska, N.M., Wyo.)

(The entomologists' interest is potato psyllid)

<u>Date</u>		<u>Place</u>	<u>Chairman</u>	<u>Secretary</u>
1938	Aug. 18-19	Laramie, Wyo.	Dr. C. H. Starr	Dr. G. H. Starr
1939	Aug. 21-22	Scottsbluff, Nebr.	Mr. T. H. Hankins	T. H. Hankins
1940,	Aug. 17-18	Monte Vista, Colo.	Mr. A. M. Binkley	Mr. W. F. McGee Acting.

HESSIAN FLY CONFERENCE

<u>Date</u>		<u>Place</u>	
1924	Dec. 31	Washington, D. C.	(Informal meeting of Federal and State Hessian fly investigators.)
1925	Jan. 5	Washington, D. C.	(Hessian fly conference.)

P U B L I C A T I O N S

California

Recent contributions of insect physiology to insect toxicology and control.  
W. M. Hoskins. Hilgardia (Calif. Sta.). vol. 13, no. 6, p. 307-386.  
Berkeley. 1940.

Delaware

Rosin residue emulsion as a sticker for lead arsenate in horticultural sprays. R. L. Pierpont. Del. Agr. Expt. Sta. Bul. 221, 35 p.  
Newark, 1939.

Report on the Tabanidae of Delaware. D. MacCreary. Del. Agr. Expt. Sta. Bul. 226, 41 p., illus. Newark. 1940.

Hawaii

Control of aphid on cucumbers. A. C. Browne. Hawaii Ext. Cir. 24. 1 p.  
Honolulu. 1940. Mimeographed.

Control of scale insects. A. C. Browne. Hawaii Ext. Cir. 27, 1 p.  
Honolulu. 1940. Mimeographed.

Insecticides which should not be used on table vegetables. A. C. Browne.  
Hawaii Ext. Cir. 28. 1 p. Honolulu. 1940. Mimeographed.

Control of mites. A. C. Browne. Hawaii Ext. Cir. 29., 1 p. Honolulu.  
1940. Mimeographed.

The tomato bug. A. C. Browne. Hawaii Ext. Cir. 38. 1p. Honolulu.  
1940. Mimeographed.

Control of flea beetles. A. C. Browne. Hawaii Ext. Cir. 40. 1 p.  
Honolulu. 1940. Mimeographed.

Mildew and aphid control on watermelons. A. C. Browne. Hawaii Ext.  
Cir. 73. Honolulu. 1940. Mimeographed.

Control of pepper weevil. A. C. Browne. Hawaii Ext. Cir. 74. 1 p.  
Honolulu. 1940. Mimeographed.

Cabbage worm control. A. C. Browne. Hawaii Ext. Cir. 75. 1 p.  
Honolulu. 1940. Mimeographed.

Control of tomato pinworm. A. C. Browne. Hawaii Ext. Cir. 76. 2 p.  
Honolulu. 1940. Mimeographed.

Control of cabbage webworm on head and Chinese cabbage. Hawaii Ext.  
Cir. 77. 2 p. Honolulu. 1940. Mimeographed.

PUBLICATIONS Continued.

Illinois

How to know and control stored-grain insects. M. D. Farrar, T. F. Winburn, and W. P. Flint. Ill. Agr. Expt. Sta. Cir. 512, 16 p., illus. Urbana. 1940.

Indiana

The biology of six species of cockroaches which inhabit buildings. G. E. Gould and H. O. Deay. Ind. Agr. Expt. Sta. Bul. 451, 31 p., illus. La Fayette. 1940.

Kansas

Combating fruit pests in Kansas. G. A. Filinger. Kans. Agr. Expt. Sta. Cir. 199, 45 p., illus. Manhattan. 1940.

Equine encephalomyelitis virus isolated from naturally infected Triatoma sanguisuga LeConte. C. H. Kitselman and A. W. Grundmann. Kans. Agr. Expt. Sta. Tech. Bul. 50, 15 p., illus. Manhattan. 1940.

Transference of Hessian fly resistance and other characteristics of Marquillo spring wheat to winter wheat. R. H. Painter, et al. Kans. Agr. Expt. Sta. Tech. Bul. 49, 55 p., illus. Manhattan. 1940.

Kentucky

How to stop weevil damage to stored beans and peas. W. A. Price. Ky. Ext. Cir. 352, 4 p., illus. Lexington. 1940.

Sprays for the home fruit garden. A. J. Olney. Ky. Ext. Cir. 353, 8 p. Lexington. 1940.

Louisiana

Entomological progress, number 2. Assembled by C. O. Eddy. La. Agr. Expt. Sta. Bul. 323, 51 p., illus. University. 1940.

The effect of lime in reducing injury by the sugarcane beetle. J. W. Ingram, W. E. Haley and L. J. Charpentier. La. Agr. Expt. Sta. Bul. 323, p. 31-33, University. 1940.

Varietal susceptibility of cane to sugarcane borer injury in 1939. J. W. Ingram and L. O. Ellisor, La. Agr. Expt. Sta. Bul. 323, p. 34-36, University. 1940.

PUBLICATIONS Continued.

Maine

Poultry handbook for 4-H Club Members. Frank D. Reed. Maine Ext. Bul. 281, 20 p., illus. Orono. 1940.

Massachusetts

Apple pests and their control. Arthur I. Bourne, Oran C. Boyd, Oliver C. Roberts and Warren D. Whitcomb. Mass. Agr. Col. Ext. Leaflet 189, 56 p., illus. Amherst. 1940.

Biological control of mealybugs in greenhouses. W. D. Whitcomb. Mass. Agr. Expt. Sta. Bul. 375, 22 p., illus. Amherst. 1940.

New Hampshire

Studies of contact insecticides: XIV, Penetration of certain liquids through the pronotum of the American roach. W. C. O'Kane, L. C. Glover, R. L. Blickle, and B. M. Parker. N. H. Agr. Expt. Sta. Tech. Bul. 74, 16 p., illus. Durham. 1940.

New York

Biology and control of the wheat wireworm, Agriotes mancus Say. W. A. Rawlins. N. Y. (Cornell) Agr. Expt. Sta. Bul. 738, 30 p., illus., Ithaca. 1940.

Non-arsenical dusts for cauliflower and cabbage worm control on Long Island. H. C. Huckett. N. Y. Agr. Expt. Sta. Bul. 695, 58 p. Geneva. 1940.

Uninfected elm wood as a source of the bark beetle (Scolytus multistriatus Marsham) carrying the Dutch elm disease pathogen. D. L. Collins, K. G. Parker, and H. Dietrich. N. Y. (Cornell) Agr. Expt. Sta. Bul. 740, 14 p., illus. Ithaca. 1940.

Oklahoma

Control cattle grubs. J. Myron Maxwell. Okla. Ext. Cir. 374, 4 p., illus. Stillwater. 1940.

The brown elm scale; description and control. F. A. Fenton. Okla. Agr. Expt. Sta. Bul. 245, 6 p., illus., Stillwater. 1940.

Pennsylvania

Deposition and retention of sprays on apples. II. D. E. H. Frear and H. N. Worthley. Pa. Agr. Expt. Sta. Bul. 400, 22 p., illus. State College. 1940.

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Wisconsin

The control of insects in cheese factories. E. M. Searls and D. N. Nusbaum. 8 p., illus. Wis. Agr. Expt. Sta. Special Cir. [unnumb.] Madison. 1940.

United States Department of Agriculture

Clothes moths. E. A. Back. U. S. Dept. Agr. Leaf. 145L, rev. 8 p., illus. 1940.

Control of the Mormon cricket by the use of poisoned bait. F. T. Cowan and H. J. Shipman. U. S. Dept. Agr. Cir. 575C, 16 p., illus. 1940.

The southern corn rootworm and farm practices to control it. Philip Luginbill. U. S. Dept. Agr. Farmers' Bul. 950F, rev., 10 p., illus. 1940.

The wheat jointworm and its control. W. J. Phillips and F. W. Poos. U. S. Dept. Agr. Farmers' Bul. 1006F, rev., 13 p., illus. 1940.

Investigations of the parasites of Popillia japonica and related Scarabaeidae in the Far East from 1929 to 1933, inclusive. T. R. Gardner and L. B. Parker. U. S. Dept. Agr. Tech. Bul. 738T, 36 p., illus. 1940.

Parasites of the oriental fruit moth in Japan and Chosen and their introduction into the United States. G. F. Haeussler. U. S. Dept. Agr. Tech. Bul. 728T, 62 p., illus. 1940.

Outside Articles

Leafhoppers: they can reduce your crop. G. E. Marshall and N. F. Childers (With H. W. Brody). Amer. Fruit Grower 60: 6-7, 11, 12, 15. Aug. 1940. (In Coop. with Ohio Univ.)

Injury to the tree and fruit from different sprays applied in 1939. F. L. Overley, E. L. Overholser and D. F. Allmendinger. Oreg. State Hort. Soc. Rpt. 31(1939): 119-124. [1940]

Pear psylla a threat to the northwest pear industry. L. Childs. Oreg. State Hort. Soc. Rpt. 31 (1939): 41, 43-45. (1940)

Oil sprays and their effects in Hood River. L. Childs. Oreg. State Hort. Soc. Rpt. 31(1939): 57-63. [1940]

Livestock fly sprays. H. H. Shepard. Pests 8: 12-13. Aug., 1940.

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Musca domestica and Hippelates flies - vectors of bovine mastitis. D. A. Sanders. Science 92: 286. Sept. 27, 1940.